

Remarks

Claims 1 and 8 have been editorially amended. Following entry of this Amendment, claims 1-27 will be pending in this application.

Objection to Claim 24

Claim 24 was objected to on grounds that the claim allegedly reads *"to form a coating coating..."*. The quoted phrase appears in claim 24 of the published PCT application, but in the Substitute Specification filed March 15, 2005 the corresponding phrase in claim 24 is "to form a coating; and". Applicants believe no amendment is called for and accordingly request withdrawal of the objection.

Rejection of Claim 16 under 35 U.S.C. §112

Claim 16 was rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, on grounds that *"It is unclear how "acetoacetoxyl groups" can function as crosslinkers, i.e. a separate additive component."* The quoted phrase appears in claim 16 of the published PCT application, but in the Substitute Specification filed March 15, 2005 the corresponding phrase in claim 16 is "acetoacetoxyl compounds". Applicants believe no amendment is called for and accordingly request withdrawal of the rejection.

Rejection of Claims 1-13, 17-19 and 24-27 under 35 U.S.C. §102(b)

Claims 1-13, 17-19 and 24-27 were rejected under 35 U.S.C. 102(b) as being "clearly anticipated" by U.S. Patent No. 5,541,251 (Bontinck et al.), on grounds, *inter alia*, that:

"Bontinck teaches aqueous polyurethane dispersions that can be used as a coating for a variety of substrates. The invented composition is an aqueous self-crosslinkable resin comprising as aqueous dispersion containing at least one polyurethane polymer and at least one vinyl polymer having chain-pendant acetoacetoxyl ester functional groups (col. 3, line 3-9). Said composition contains

the polyurethane polymer(s) and the vinyl polymer(s) in a weight ratio of 1:10 to 10:1 (col. 3, line 52-55). Being that these polymers are the only two components in the composition, such a composition comprising said polymers in the disclosed weight ratios would yield resins having the weight percentages of claims 9, 10, and 20 of the instant application. The polyurethane polymer to be used in the invented composition is prepared by the reaction of an organic isocyanate and an organic compound containing at least two isocyanate-reactive groups followed by addition of an active hydrogen-containing chain extender (col. 4, line 8-19. Said polyisocyanate is selected from aliphatic and aromatic isocyanates (col. 4, line 20-23). Suitable organic compounds containing at least two isocyanate-reactive groups are selected from a group including polyester, polyether, and polycarbonate polyols (col. 4, line 53-56). To this prepared isocyanate terminated prepolymer, a chain extender is added in an amount such that the NCO:active hydrogen ratio is in the range of 1.0:0.7 to about 1.0:1.1 (col. 8, line 21-24). Hydrazine is included in the list of suitable chain extenders (col. 7, line 63). Due to the fact that the reference discloses the use of excess chain extender, such a polymer would have hydrazine functionalities.” (see the Office Action at page 4, emphasis added).

Applicants respectfully disagree. Rejected independent claims 1 and 24 recite *inter alia* a polyurethane dispersion having a second crosslinkable functional end group “comprising an acetoacetoxy, diacetone, amine or hydrazide group or combination thereof”. Applicants define the term “functional end group” as follows:

“[0016] By “functional end group” is meant that the functional group or groups are primarily located at the ends of the molecular chain. As an example, the crosslinkable polyurethane polymer usable in the present invention has at least a functional group located at one or more ends of the polyurethane polymer.”

Bontinck et al. do not show such a polyurethane dispersion, and do not show a polyurethane having “hydrazine functionalities”. Bontinck et al.’s polyurethane polymer has anionic salt groups as the **“sole chain-pendant functional group”** (see e.g., the Abstract and col. 2, lines 57-62, emphasis added). Bontinck et al. say that their prepolymer may be chain-extended with various polyamines, and that the “total amount of polyamine should be calculated

according to the amount of isocyanate groups present in the polyurethane polymer in order to obtain a fully reacted polyurethaneurea polymer **with no residual free isocyanate groups**" (see col. 7, lines 49-53, emphasis added). However, Bontinck et al. do not say that the fully reacted polyurethane urea polymer should also have unreacted chain extender functionality, and a polymer having such functionality would contravene Bontinck et al.'s requirement that anionic salt groups be the sole chain-pendant functional group.

The Office Action's NCO:active hydrogen ratio argument does not take into account that Bontinck et al. also use a chain termination agent. The chain termination agent competes with the polyamine chain extender for reaction with available isocyanate groups in the prepolymer. The chain termination agent and prepolymer react to form a partially-terminated moiety with residual unreacted isocyanate functionality which can in turn react with available active hydrogen atoms in the polyamine chain extender. For example, in Bontinck et al. Example 6 (the only working example that employs hydrazine as a chain extender), the following reactants were employed to make a chain-extended polyurethaneurea polymer dispersion(see col. 14, lines 3-11):

Ingredient	Quantity Employed	Equivalent Weight or Molecular Weight	Active Hydrogen Atoms per Molecule	Isocyanate (NCO) or Active Hydrogen (H) Equivalents
Isocyanate-Functional Prepolymer	450.0 g	0.56 meq/g	None	0.25 NCO
Hydrazine	4.47 g (29.8 g of a 15 wt. % solution)	32.05 g/mole	2	0.28 H
Ammonia	4 g (16 g of a 25 wt. % solution)	17.03 g/mole	1	0.23 H

The ammonia serves as a chain termination agent, and forms amide groups on the polyurethaneurea polymer. The hydrazine serves as a chain extender, and becomes part of the polymer backbone. The hydrazine does not provide a "crosslinkable functional end group", let alone one comprising an "acetoacetoxyl, diacetone, amine or hydrazide group or combination thereof". Bontinck et al. do not anticipate rejected independent claims 1 or 24 or the claims dependent thereon. Applicants accordingly request withdrawal of the 35 U.S.C. §102(b) rejection of claims 1-13, 17-19 and 24-27 as being clearly anticipated by Bontinck et al.

Rejection of Claims 14-16 and 20-23 under 35 U.S.C. §103

Claims 14-16 and 20-23 were rejected under 35 U.S.C. 103(a) as being unpatentable over Bontinck et al. in view of U.S. Patent No. 6,063,861 (Irle et al.), on grounds that:

"Bontinck teaches the aforementioned polyurethane-polyacrylate dispersion.

The composition disclosed in the prior art has been shown to be substantially similar to that as claimed in the instant application. However, there is no mention of the addition of a crosslinker to the invented composition.

"[Irle] teaches self crosslinkable polyurethane-polyacrylate hybrid dispersions comprising a polyurethane dispersion and a polyacrylate polymer as well as a difunctional amine (see abstract). The reference discloses that it has been described that polyurethane-polyacrylate hybrid dispersion which have carbonyl functional groups and polyfunctional amines form a stable, self-crosslinking, one component composition (col. 2, line 4-11). It has been held that the selection of a known material based on its suitability for its intended use supports a prima facie case of obviousness (Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945)). Therefore, it would have been obvious to have added a polyamine crosslinking component to the composition taught by Bontinck to form a storage-stable, self-crosslinking, one component composition.

"Although [Irle] does not disclose an amount of polyamine crosslinker to be used, such a parameter is clearly a result-effective variable. It is well known in the art that crosslinking adds strength and toughness to a composition. However, the

addition of too much crosslinker will yield a composition that is too brittle to have any applicability. Therefore, it would have been obvious to one having ordinary skill in the art to have optimized the amount of crosslinker added to the composition taught by Bontinck to produce a coating composition having the desired strength and toughness while also possessing a desired degree of flexibility.

“Furthermore, being that the composition taught by Bontinck has been shown to be anticipatory of that as claimed in the instant application, the addition of a crosslinker to said composition reads on the coating composition of claim 20 and the articles of claims 21-23 of the instant application.” (see Office Action at pages 5-6, emphasis added).

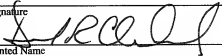
Reconsideration is requested. For the reasons outlined above, the Bontinck et al. compositions have not been shown to be “substantially similar to that as claimed in the instant application”, and have not been shown to be “anticipatory of that as claimed in the instant application”. Applicants agree however that there is no mention in Bontinck et al. of the addition of a crosslinker. Bontinck et al. in fact expressly teach away from crosslinker addition. For example, Bontinck et al. distinguish crosslinker-containing formulations at col. 1, lines 29-48 and col. 2, lines 1-21. Bontinck et al. also expressly say that their compositions are **“selfcrosslinkable at ambient or low temperature, i.e. without the addition of external cross-linking agents or catalysts”**, see e.g., col. 2, lines 44-48, emphasis added, and that their compositions **“do not incorporate expensive and potentially toxic external crosslinking agents”** (see e.g., col. 3, lines 1-2, emphasis added). In view of these admonitions, a person having ordinary skill in the art would not be motivated to add Irle et al.’s difunctional primary or secondary amine to Bontinck et al.’s compositions. If asked to consider the matter anyway, a person having ordinary skill in the art would conclude that adding Irle et al.’s difunctional primary or secondary amine to Bontinck et al.’s compositions would be unnecessary, undesirable or both. Applicants accordingly request withdrawal of the 35 U.S.C. §103(a) rejection of claims 14-16 and 20-23 as being unpatentable over Bontinck et al. in view of Irle et al.

Conclusion

Applicants have made an earnest effort to address the rejections. Withdrawal of the rejections and allowance of all claims are requested. The Examiner is also requested to call the undersigned attorney if there are any questions regarding the application or this amendment.

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